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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

RDC DEC ALPHA 7760
APPLICATION COMMUNICATIONS ARCHITECTURE

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Introduction

Purpose

The purpose of this document is to provide the reader with a complete understanding of the applications available on the RDC DEC Alpha 7760 and the most effective and fastest methods for accessing them. This document provides guidance on the specific methods and procedures available for users to connect to and run applications on the NOAA Computer Division RDC DEC Alpha 7760 using NOAA's modern network infrastructure. It details the various methods available of accessing the RDC DEC Alpha 7760 and standard application configurations. This document was created for the purpose of communicating essential technical information to enable microcomputer and Local Area Network (LAN) support personnel to better support their users who need access to applications and data residing on the RDC DEC Alpha 7760.

Audience

The intended audience of this document is microcomputer, network, and application technical support staff that work with the users of the DoC and NOAA who require access to the RDC DEC Alpha 7760 and its applications.

Scope

The scope of this document includes:

- An overview of the RDC DEC Alpha 7760.
- A discussion of the DoC/NOAA enterprise network infrastructure including sites, speeds and protocols.
- An explanation of the default access specifications of the RDC DEC Alpha 7760 including dial-in terminal types, printing specifications, and keyboard mapping specifications.
- Supported communications software and specific configuration requirements.
- A detailed presentation of Terminal/Host access methods and Client/Server access methods.

There are also several important appendices that summarize key information on printing, keyboard mapping and access methods. Generally, the level of detail will discuss parameter settings of operating system and terminal emulation software in order to access the RDC DEC Alpha 7760 computer over a Public Circuit Switched Network (PCN) and Public Packet Switched Data Networks (PPSNs). The reader should have sufficient knowledge of these subjects to enable them to configure Personal Computer (PC) operating systems and client software to access RDC DEC Alpha 7760 applications. Additional skills helpful to understanding this material will be an understanding of basic diagnostic and corrective measures for operating system and application software, local data/telecommunication link, and their associated errors.

The RDC DEC Alpha 7760

The RDC DEC Alpha 7760 can be accessed from The Internet, DoC/NOAA headquarters MAN and The NOAA WAN via TCP/IP using a Fully Qualified Domain Name (FQDN) of *alpha.rdc.noaa.gov*. The RDC DEC Alpha 7760 can also be reached by using dial-up over the PCN at (301) 763-4755.

The RDC DEC Alpha 7760 is a DEC Alpha 7000 Model 760 minicomputer. It was engineered to function as a high-speed enterprise server with the capacity to support hundreds of simultaneous processing tasks. The system is capable of executing 592 Million Instructions Per Second (MIPS) using six RISC processors. It has 96.8 gigabytes of mass storage, and 1 gigabyte of memory. The RDC DEC Alpha 7760 runs the OpenVMS multi-user operating system. Its primary applications are database, running in an Oracle SQL Relational Database Management System (RDBMS). The RDC DEC Alpha 7760 supports 24 major applications that are critical to NOAA's daily operation. These include the NOAA accounting system (FIMA), The NOAA grants system (NGS), the controlled correspondence system (CCS), and the time and attendance payroll edit and validation system (T&A). Nationwide there are over 2,000 registered users of the system, comprising roughly 14% of NOAA's employees. There are approximately 2,000 logins per day and over 1000 batch jobs per day. The system is operated on a 7x24 basis with around the clock operators.

NOAA Network Architecture

Metropolitan Area Network

The DOC/NOAA Metropolitan Area Networks (MANs) are composed of the various DOC and NOAA LANs located in the Washington, DC metropolitan area. These LANs are interconnected via one of Bell Atlantic's Fiber Distributed Data Interface (FDDI) Network Services (FNS) circuits. Users connect to the FNS backbone at native Ethernet speeds of up to 10 megabits per second (mbps). In effect, users can access any resource in the Washington, DC Metropolitan area as if it were on their respective LAN. The MAN consists of two FNS Domains; NOAA FNS Domain number 26 and DoC FNS Domain number 111. Sites that connect to the RDC DEC Alpha 7760 using the MAN are identified in Figure 1 below. For organizations that are located within the Washington, DC Metropolitan area, the preferred method of access to the RDC DEC Alpha 7760 is via the FNS MAN (see Appendix D for a more detailed list of MAN and WAN connections).

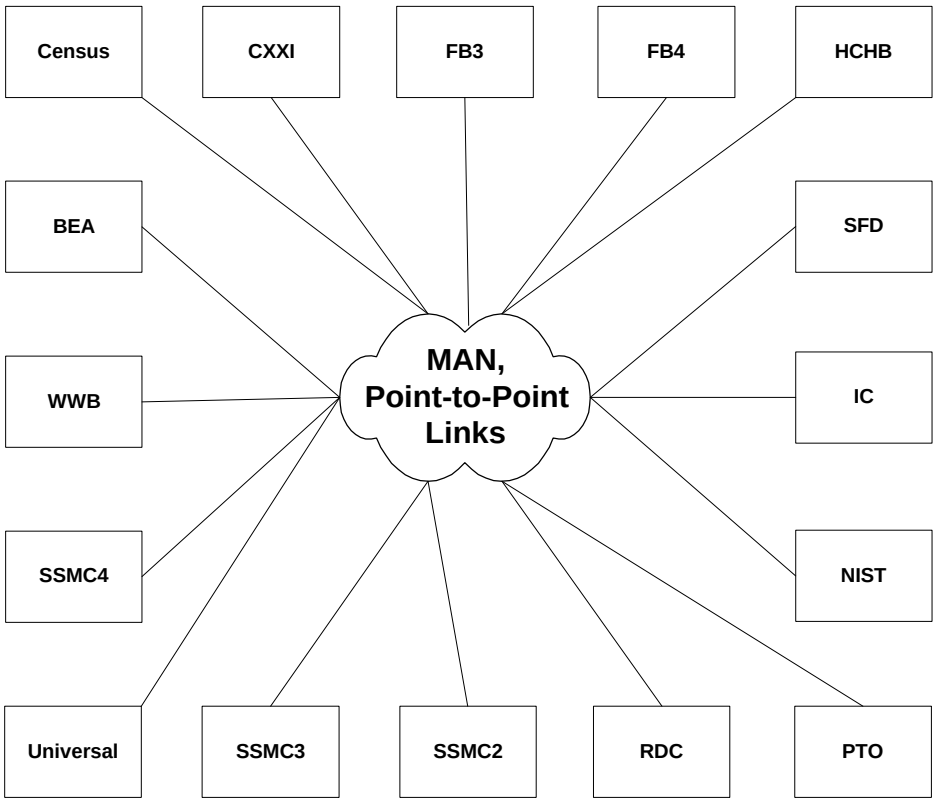

Figure 1

Wide Area Network

The NOAA Wide Area Network (WAN) provides fast, reliable and managed data communications between users at the Administrative Support Centers, NOAA headquarters and critical host computer systems. Some of the more well known host computers that maintain a Point-of-Presence (POP) on the NOAA WAN are:

- The RDC DEC Alpha 7760 located at RDC Landover, MD.
- The Human Resources Database System (HRDS) at DoC's Office of Computer Services in Springfield, MD.
- The Personnel/Payroll System at USDA's National Finance Center (NFC) in New Orleans, LA.

Most of the links between the sites on the WAN are currently provided through CISCO 7000 series routers running TCP/IP over a Frame Relay (FR) network. The FR network services are provided and maintained through the AT&T FTS2000 contract. The bandwidth offered through this PPSN is up to 256 Kilobits per second (kbps) access port speed, with 32kbps per Permanent Virtual Circuit (PVC). Major sites on the WAN that are connected to the RDC DEC Alpha 7760 are shown in Figure 2.

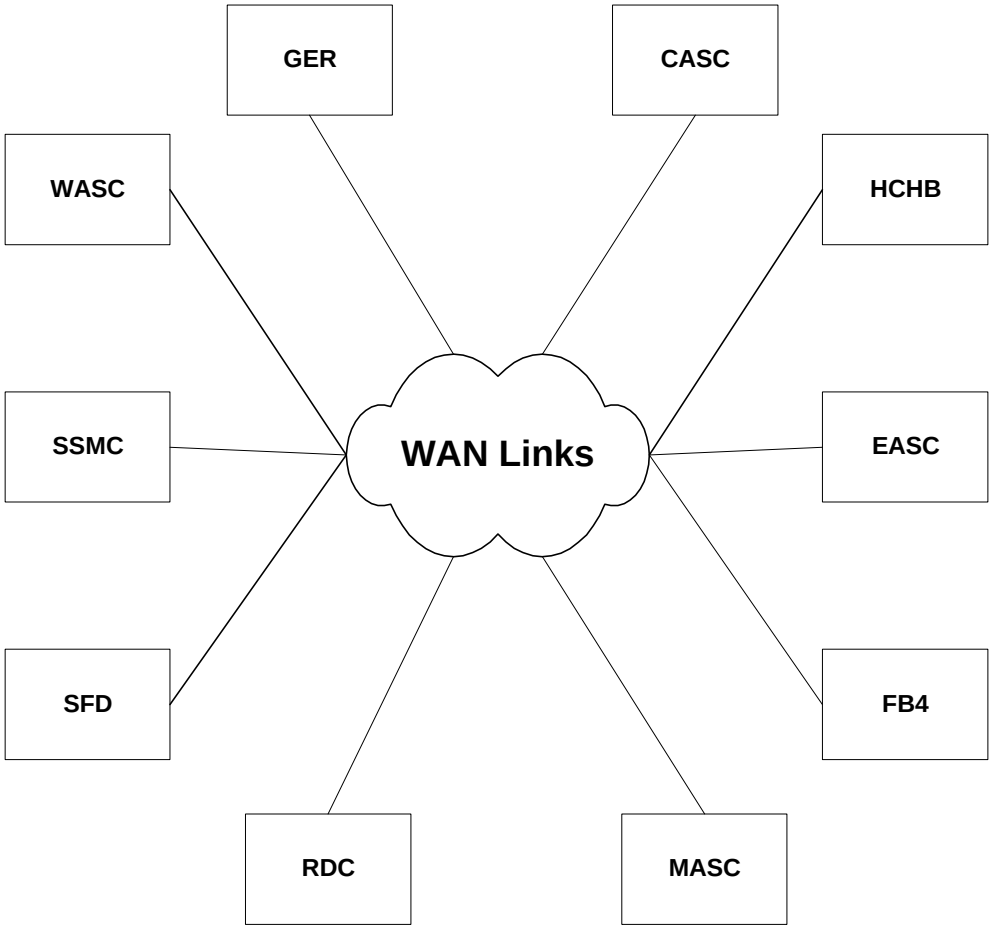

Figure 2

Internet Connections.

The RDC DEC Alpha 7760 is connected to The Internet via an Internet Service Provider (ISP). Access to The Internet is achieved through the Washington DC FNS MAN via SSMC3's ISP connection.

Dial up Infrastructure.

Dial-up access is provided to the RDC DEC Alpha 7760 over the PCN using 9.6–28.8kb modems to the RDC's hunt group: (301) 763-4755. This single telephone number connects the users to one of 80 modems that are connected to 3 terminal servers. The connection is then made to the RDC DEC Alpha 7760 using DEC's LAT protocol over the RDC LAN.

Although dial-up through a PCN to the RDC Alpha 7760 is currently supported, future support will be limited to special cases. Your site must purchase and maintain enough modems and telephone lines for your users' access requirements. In addition, your site must pay your users' long distance service to access the RDC DEC Alpha 7760's POP on the PCN. The RDC is reducing the number of lines it provides for dial-up access, due to the increase in WAN, MAN and Internet utilization. Dial-up PCN access is being phased out as sites make the transition to LAN, MAN, WAN, or Internet access. Technical support staff whose locations are on the WAN, MAN, or The Internet, yet who have users that are still dialing in to access the RDC DEC Alpha 7760, should convert to network based access.

NOAA Network Architecture Summary

The Network Architecture and infrastructure that provides connectivity to the RDC DEC Alpha 7760 was designed to provide extremely fast, reliable, secure, and cost-effective access to the mission-critical and office automation applications deployed for NOAA organizations. The preferred method to access the RDC DEC Alpha 7760 is via a Telnet or a Client/Server application over a TCP/IP network connection across the MAN, WAN, or The Internet. Although dial-up over PCN is currently supported, future support will be limited to special cases. Because NOAA is so heavily networked, particularly in the Washington, DC metropolitan area and the major administrative facilities, dial-up access to the RDC DEC Alpha 7760 is no longer an effective or efficient access method.

RDC DEC Alpha 7760 Network Access Methods

Access to the RDC DEC Alpha 7760 can be generally described in the following four basic configurations in order of preferred method:

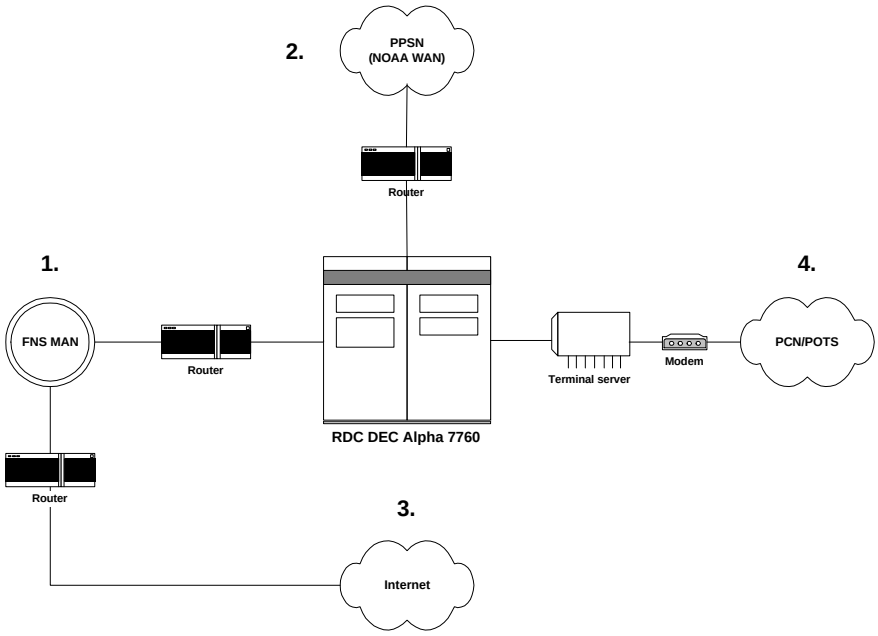

Figure 3

1. Network access to the RDC DEC Alpha 7760 via FNS MAN. This method consists of a PC connected to a LAN via a Network Interface Card (NIC) using either Telnet software or a Client/Server application to access a resource over the DOC/NOAA headquarters MAN. Access to the RDC DEC Alpha 7760 is made from the user's LAN through a local router to the FNS MAN.
2. Network access to the RDC DEC Alpha 7760 via DOC/NOAA WAN. This access method is essentially the same as in access method number 1, except that instead of connecting over the DOC/NOAA headquarters MAN , a connection is made from a local router over the NOAA Network.
3. Network access to the RDC DEC Alpha 7760 via The Internet.
4. Dial-up to the RDC DEC Alpha 7760 from standalone PCs. This is the most basic access method. It consists of a single PCN connection via a single telephone line by a PC. The PC utilizes asynchronous data communication, terminal emulation software and a modem to emulate a Virtual Terminal (VT) session on a remote host computer. The user then accesses an application which resides on the RDC DEC Alpha 7760.

RDC DEC Alpha 7760 Application Access Methods

All users connect to and run applications on the RDC DEC Alpha 7760 using DEC's VT emulation as opposed to an IBM host computer, which communicates with its users via 3270 emulation of IBM's Systems Network Architecture (SNA). Whereas IBM hosts using SNA act as the network control center, The RDC DEC Alpha 7760 merely participates in the network as another TCP/IP host by authenticating and servicing user requests for data and application services. The RDC DEC Alpha 7760 is configured to accept direct network connections using the TCP/IP network protocol. Network users connect directly to the RDC DEC Alpha 7760 using the TCP/IP protocol over the MAN, WAN or Internet. In the dial-up over PCN environment, users interact with the RDC DEC Alpha 7760 indirectly via a terminal server. The terminal server then communicates with the RDC DEC Alpha 7760 using DEC's LAT protocol over the RDC LAN. The supported access methods (see figure 4 for a graphic representation of these methods) are:

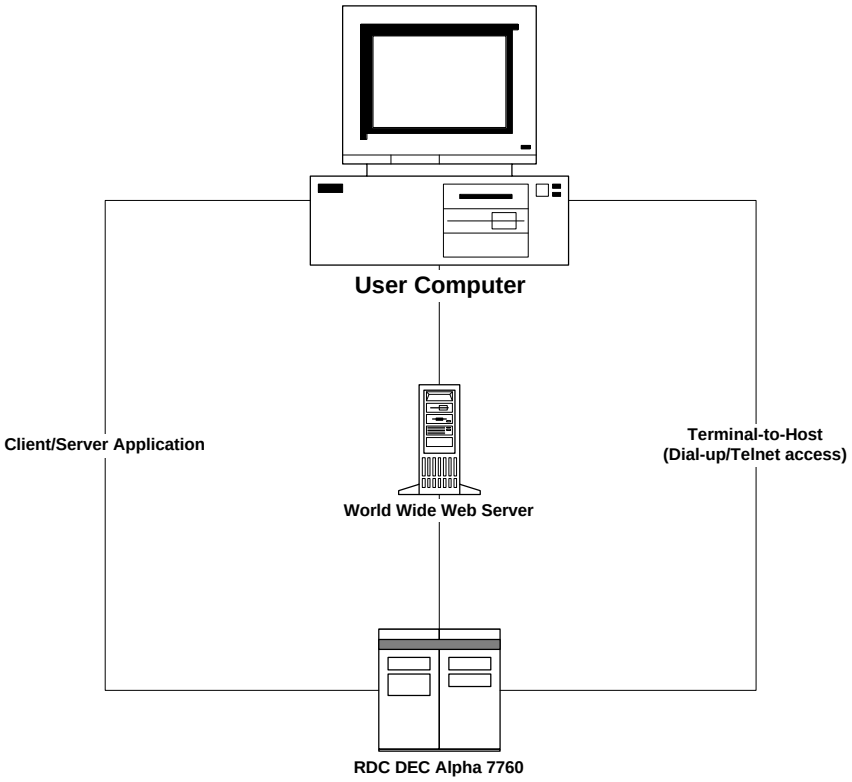

Figure 4

- Terminal/Host, using either terminal emulation over asynchronous dial-up or Telnet, over a network.
- Client/Server over a network.
- World Wide Web (WWW) Browser connection to a Web server.

As of this writing, there are 22 different Terminal/Host, 2 Client/Server and 2 WWW implementations of applications on the RDC DEC Alpha 7760 (see Appendix B, Table 7).

Default Application Access Settings

In order to access applications on the RDC DEC Alpha 7760, the PCs in your facility must use one of the following application access methods:

- Terminal/Host: Using PC-based terminal emulation software (supported using either Telnet over TCP/IP or asynchronously using a dial-up connection) to access legacy applications.
- Client/Server: Using an application provided by either RDC or the application's developer (supported over TCP/IP only).
- WWW Browser: Using a WWW Browser to connect to a WWW Server (supported over TCP/IP only).

Hardware Requirements

The newer Client/Server and WWW based applications require that you use a PC capable of meeting the operating system requirements of either Microsoft Windows 95 or Windows NT Workstation.

Terminal emulation software requirements

Your users will require PC terminal emulation software to access legacy applications on the RDC DEC Alpha 7760. The software you choose must provide VT100, VT102, VT220, and VT320 terminal emulation. Your choice of terminal emulation software should support both asynchronous dial-up and Telnet (over a TCP/IP network) connections. The software you choose must also have the ability to accept modifications to the default terminal settings and keyboard mappings (these and other settings are outlined in appendix A). Additionally, the terminal emulation software must support the Kermit, XModem and ZModem file transfer protocols using the specified emulation types. RDC personnel have successfully tested and will support OnNet32 for Windows 95 for all TCP/IP network and asynchronous dial-up connections to the RDC DEC Alpha 7760. ProComm Plus 4.x for Windows 95 also delivers satisfactory results over TCP/IP network and dial-up connections.

Application Access Scenarios

There are three ways to access information on the RDC DEC Alpha 7760. One method is a Terminal/Host implementation, another is Client/Server, and yet another is via a Web Browser. Each of these methods can be used across the MAN, WAN, or Internet. Terminal/Host differs from the other two application access methods in that either asynchronous terminal emulation over a dial-up or Telnet over a TCP/IP connection can be employed. Of the three types of connections, Client/Server is unique in that it differs in the method that the application functions. The WWW is another part of the TCP/IP application layer related to Telnet, and like Telnet, the WWW's HyperText Transfer Protocol (HTTP) does not divide processing tasks between the user's computer and the server.

Terminal/Host

Terminal/Host computing is characterized by all of the work being done on the application level by the host side. The asynchronous terminal emulation software or the Telnet application only serves as and extension of the connection medium: this facilitates

a data connection to a computer on which work can be done.

Telnet Session On TCP/IP

As previously stated, a TCP/IP-based Telnet session is similar to an asynchronous dial-up terminal emulation session in several respects. Telnet applications are designed to emulate a VT. Like an asynchronous dial-up terminal emulation session, the first step in initiating a typical TCP/IP-based Telnet session to a remote server is by launching a Telnet application on the PC you wish to connect from. In order to function, the client machine must have a functioning NIC and a TCP/IP protocol stack. The RDC supports FTP Software's OnNet version 2.x for Windows 3.x, OnNet32 version 2.x for Windows 95/Windows NT 4.x, and Microsoft's TCP/IP protocol stacks. After selecting the appropriate terminal communication settings for the application you wish to use, select the application's command to connect to the RDC DEC Alpha 7760. Enter the FQDN for the RDC DEC Alpha 7760, *alpha.rdc.noaa.gov*, into the address space if the entry is not already available. The TCP/IP connection is then established, via the network, between the local machine's Telnet application and the RDC DEC Alpha 7760 over TCP port 23. Unlike an asynchronous dial-up terminal emulation session using the PCN, when connecting to the RDC DEC Alpha 7760 when using a MAN or WAN network, connections are transparent to the user. There is no call blocking, and connections are noticeably faster and error free compared to an asynchronous PCN connection.

Telnet Session On TCP/IP Printing Overview

Printing is delegated to the print services within the operating system that the remote computer serving the application is running on. There are two types of print destinations available. They are called VMS named-queue and VT Auto Print, respectively.

VMS named-queue

A VMS named-queue is defined on the RDC DEC Alpha 7760 by a system administrator. When a print job is sent to a VMS named-queue, the operating system looks up the entry and determines its characteristics. If the printer is directly connected to the RDC DEC Alpha 7760, the printout is sent directly to the device. A system operator then sends the user the printout in the mail. If the printer is directly connected to the network, a connection is made to the printer and the printout is sent over the TCP/IP network where it prints on the remote printer.

VT Auto Print

When VT Auto Print is used, the operating system first determines to which pseudo VT connection the user is attached. The print job is then spooled to the user's VT session. The RDC DEC Alpha 7760 notifies the VT session that it is sending a print job by sending the terminal the control character sequence Control Sequence Introducer (**CSI**) **?5i** to turn on VT Auto Print mode. These characters tell the Telnet software to send the incoming data stream to the device defined as its local VT printer device by the Telnet software. To end the print job, the RDC DEC Alpha 7760 appends the control character sequence **CSI ?4i,** to turn off VT Auto Print mode, to the end of the data stream. These characters tell the Telnet software to stop sending data to the device defined as the local VT printer device. The Telnet software can be configured to print to any device that is

local to the user's computer. The local VT printer device could be a local or network printer, or it can be redirected to a file. To the user, printing involves selecting the appropriate remote application's print command and specifying a destination. Ultimately, the destination that the print job arrives at is dependent on the following conditions:

- The application programmer has enabled printing in the application.
- The type of printing the application programmer has allowed in their application.
- The type of print destinations defined on the RDC DEC Alpha 7760.
- An RDC DEC Alpha 7760 system administrator has allowed the user access to any print destinations.
- The Telnet software has been configured correctly by the user and supported by the remote application.

If all of the preceding conditions are configured appropriately for the remote application, then after the user specifies a destination for the print job, they will receive the printout.

Terminal Emulation Over Dial-Up Asynchronous Connection

The first step in initiating a typical dial-up asynchronous terminal emulation session to the RDC DEC alpha 7760 is by launching a terminal emulation application on the PC from which you wish to connect. In order to function, the client machine must have a modem connected to the PCN. First, select the appropriate data communication and terminal settings for the application you wish to use (the most commonly used defaults can be found in appendix A); next, select the application's command to dial (301) 763-4755. A PCN connection will be made from the modem at the local machine to one of the RDC's modems in Landover. After the connection over the PCN leg has been established, a connection is made from the RDC modem, via a terminal server, to the RDC DEC Alpha 7760 over the RDC LAN. Once the connection is established, login and execution of applications on the RDC DEC Alpha 7760 server can occur. The PCN portion of the connection is very vulnerable to interference, and can introduce noise in the form of "garbage characters" on the terminal screen. Dropped connections are common, and there is a high probability of receiving a busy signal when attempting to connect.

Dial-Up Terminal Emulation Session Printing Overview

Printing is performed using the print services in the operating system that the remote computer serving the application is running on. There are two types of print destinations available. They are called VMS named-queue and VT Auto Print, respectively.

VMS named-queue

A VMS named-queue is defined on the RDC DEC Alpha 7760 by a system administrator. When a print job is sent to a VMS named-queue, The VMS operating system looks up the entry and determines its characteristics. If the printer is directly connected to the RDC DEC Alpha 7760, the print job is sent directly to the device. A system operator then sends the user the printout in the mail. If the printer is directly connected to the network, a connection is made to the printer and the printout is sent over the TCP/IP network where it prints on the remote printer.

VT Auto Print

When VT Auto Print is used, the operating system first determines to which pseudo VT connection the user is attached. The print job is then spooled to the user's VT session. The RDC DEC Alpha 7760 notifies the VT session that it is sending a print job by sending the terminal the control character sequence Control Sequence Introducer (**CSI**) **?5i** to turn on VT Auto Print mode. These characters tell the terminal emulation software to send the incoming data stream to the device defined as its local VT printer device by the terminal emulation software. To end the print job, the RDC DEC Alpha 7760 appends the control character sequence **CSI ?4i,** to turn off VT Auto Print mode, to the end of the data stream. These characters tell the terminal emulation software to stop sending data to the device defined as the local VT printer device. The terminal emulation software can be configured to print to any device that is local to the user's computer. The local VT printer device could be a local or network printer, or it can be redirected to a file. To the user, printing involves selecting the appropriate remote application's print command and specifying a destination. Ultimately, the destination that the print job arrives at is dependent on the following conditions:

- The application programmer has enabled printing in the application.
- The type of printing the application programmer has allowed in their application.
- The type of print destinations defined on the RDC DEC Alpha 7760.
- An RDC DEC Alpha 7760 system administrator has allowed the user access to any print destinations.
- The terminal emulation software has been configured correctly by the user and is supported by the remote application.

If all of the preceding conditions are configured appropriately for the remote application, then after the user specifies a destination for the print job, they will receive the printout.

Client/Server Over TCP/IP

Separating a task by breaking it into parts and assigning each part to a different process can result in greater speed and efficiency. The same applies to certain computerized tasks: a network allows one computer to hand off part of the task to another computer with hardware and software optimized for that kind of work. This is called client/server computing, and requires an application that has two parts: One running on the client and the other on the application server. Applications that run over a network are not automatically client/server. The two major components of the Client/Server model can be differentiated as follows:

Client Attributes

The client component of the application issues requests to the server. It is dedicated to the user's specific session. The client is responsible for maintaining and processing the entire dialog with the user at the application. The client portion makes it look like the entire application is executing on the user's machine without the use of server processes. At the system services level, the client portion is responsible for detecting and accepting service requests from the application and redirecting them to the server component.

Server Attributes

The server component is reactive. It is continually running on the server, providing services to many clients simultaneously. The server process is triggered by the arrival of its client component requests. Servers perform a predefined set of functionally related transactions that are centered toward accessing, storing, and organizing shared data. Client/Server applications use the same TCP/IP network layers as Terminal/Host applications to communicate. The difference between them is in the TCP/IP services that are used over the network. Client/Server applications generally communicate using Remote Procedure Calls (RPCs). RPC communications occur using port 111 over both TCP and UDP. Server addresses and port numbers are stored in files specific to the application. A user using a Client/Server application simply launches the application on their local machine. The client portion prompts the user for their account information and sends it to the server through the established connection to the server portion. The server portion of the application hands the data off to its user authentication process. The user authentication process verifies the user's credentials, and if valid, acknowledges the access request through the server component to the calling client.

Client/Server Printing Overview

Printing is performed using the local print services in the operating system that the client component is running on. To the user, printing is performed just as any other application running on their computer in a LAN environment. Users can print to any printer setup on their local machine either locally connected or a shared printer on their site's LAN.

World Wide Web

The World Wide Web utilizes a variant of FTP, called HTTP. HTTP runs atop the TCP/IP protocol and is considered and application, like Telnet or FTP. World Wide Web access is fundamentally similar to an FTP file transfer. The major difference between other TCP/IP applications and HTTP is in the interface used. A client application, called a Web Browser, runs on the user's computer. The user enters the address of the machine and the resource that they wish to access in the FQDN format preceded by the keyword HTTP followed by a colon and two forward slashes. The HTTP protocol utilizes hypertext links within documents to facilitate navigation between different documents on the same server, different servers, and to carry out local and remote commands. The user can execute a hypertext link by clicking on it with their mouse cursor. The server side of the HTTP process consists of a computer running the TCP/IP protocol and an HTTP daemon. The server runs the HTTP daemon continually, waiting for and servicing client requests for hypertext documents. When a user requests a connection through a World Wide Web Browser to a WWW server. The server forwards the request to the HTTP daemon, which then sends the requested document to the client. The HTTP Server does not share processing tasks as in a Client/Server session. There are many other functions available through HTTP, but a detailed description of HTTP capabilities is beyond the scope of this document.

RDC DEC Alpha 7760 Access Summary

Historically, data communications has been accomplished using standard asynchronous dial-up terminal emulation over the PCN. Despite the continuing buildup of DOC/NOAA

data/telecommunications infrastructure—specifically the increased use of local, metropolitan, and wide area networking technologies—the migration from dial-up to network-based access to the RDC DEC Alpha 7760 away has been a slow one. The speed, reliability, and manageability of these technologies is by far superior to the expense and maintenance issues which plague those activities which continue to use dial-up access as their connection method of choice. Your site should adopt a LAN, MAN, WAN, or Internet-based access solution now that will enable your users to connect to the RDC DEC Alpha 7760 using the TCP/IP protocol. This strategy will enable your users to continue using Telnet to connect to the RDC DEC Alpha 7760's legacy applications. Additionally, your users will be able to access information on the RDC DEC Alpha 7760 by using Client/Server applications or a Web Browser. These new applications are easy to administer and maintain compared to the legacy Terminal/Host based access methodologies. Asynchronous dial-up connectivity to legacy applications residing on the RDC DEC Alpha 7760 is being phased out. In order to access legacy, present, and subsequent generations of data access and Client/Server applications, adopt an open, TCP/IP based, network strategy for your users. The staff at the RDC are ready to assist you in making these migration choices as easy as possible.

Appendices

A. Generic Settings For Accessing the RDC DEC Alpha 7760

The following guidelines are provided for most connections; Applications that require different specific settings will be identified under their names in appendix B.

Default Terminal Settings

The DEC Multinational Character Set

The default character set used by terminal emulation software, and expected by the RDC DEC Alpha 7760, is commonly referred to as The DEC Multinational Character Set. The DEC Multinational Character Set is listed in every DEC VT user manual. For your convenience, the DEC Multinational Character Set has been included in this appendix so that you may use it as a reference tool when setting up or troubleshooting Terminal/Host applications. The DEC Multinational Character Set is split into 2 halves, The left half is called the ASCII Table. The ASCII table contains text and control characters that are used by all terminal emulation software. The right half, called the DEC Supplemental Graphic Set, is only supported by True DEC VT series terminals and better terminal emulation software which fully support the DEC Multinational Character Set. Terminal emulation software vendors implement routines to modify the characters their software interprets differently; Therefore, it is important to review the user manual for the software in use at your location for instructions on how to modify its behavior. The RDC Alpha 7760 is configured to expect the default DEC VT character settings.

At the bottom of Figure 5 you will notice that there is a legend. This legend illustrates the manner in which the tables are organized. Each character's octal, decimal and hexadecimal values are displayed in a column to the right of the character's visual representation. Each table begins with a row and column number. The row and column numbers are used to locate the character you wish to check. The binary values for each character are located in each row and column directly under these numbers. The row and column numbers are used interchangeably with character values when describing characters in DEC documentation; In those instances row and column numbers are displayed in the format ***row/column***. At the bottom of each table is a horizontal line separated by 3 vertical bars along its length: these delineate the *control* (**C0**) *codes* from the *Graphic Language* (**GL**) *codes* used in Terminal/Host communications. Columns 0 and 1 of each table are designated as C0 codes while columns 2 through 7 are designated as GL codes. The characters that will be of the greatest importance to you in your work will be the C0 codes.

Left Half -- ASCII Set

ROW	COLUMN 0		COLUMN 1		COLUMN 2		COLUMN 3		COLUMN 4		COLUMN 5		COLUMN 6		COLUMN 7	
	BITS b8 b7 b6 b5 b4 b3 b2 b1	0 0 0 0		0 0 0 1		0 0 1 0		0 0 1 1		0 1 0 0		0 1 0 1		0 1 1 0		0 1 1 1
0	0 0 0 0	NUL	0 0 0	DLE	20 16 10	SP	40 32 20	0	60 48 30	@	100 64 40	P	120 80 50	`	140 96 60	p	160 112 70
1	0 0 0 1	SOH	1 1 1	DC1 (XON)	21 17 11	!	41 33 21	1	61 49 31	A	101 65 41	Q	121 81 51	a	141 97 61	q	161 113 71
2	0 0 1 0	STX	2 2 2	DC2	22 18 12	"	42 34 22	2	62 50 32	B	102 66 42	R	122 82 52	b	142 98 62	r	162 114 72
3	0 0 1 1	ETX	3 3 3	DC3 (XOFF)	23 19 13	#	43 35 23	3	63 51 33	C	103 67 43	S	123 83 53	c	143 99 63	s	163 115 73
4	0 1 0 0	EOT	4 4 4	DC4	24 20 14	$	44 36 24	4	64 52 34	D	104 68 44	T	124 84 54	d	144 100 64	t	164 116 74
5	0 1 0 1	ENQ	5 5 5	NAK	25 21 15	%	45 37 25	5	65 53 35	E	105 69 45	U	125 85 55	e	145 101 65	u	165 117 75
6	0 1 1 0	ACK	6 6 6	SYN	26 22 16	&	46 38 26	6	66 54 36	F	106 70 46	V	126 86 56	f	146 102 66	v	166 118 76
7	0 1 1 1	BEL	7 7 7	ETB	27 23 17	'	47 39 27	7	67 55 37	G	107 71 47	W	127 87 57	g	147 103 67	w	167 119 77
8	1 0 0 0	BS	10 8 8	CAN	30 24 18	(	50 40 28	8	70 56 38	H	110 72 48	X	130 88 58	h	150 104 68	x	170 120 78
9	1 0 0 1	HT	11 9 9	EM	31 25 19	)	51 41 29	9	71 57 39	I	111 73 49	Y	131 89 59	i	151 105 69	y	171 121 79
10	1 0 1 0	LF	12 10 A	SUB	32 26 1A	*	52 42 2A	:	72 58 3A	J	112 74 4A	Z	132 90 5A	j	152 106 6A	z	172 122 7A
11	1 0 1 1	VT	13 11 B	ESC	33 27 1B	+	53 43 2B	;	73 59 3B	K	113 75 4B	[	133 91 5B	k	153 107 6B	{	173 123 7B
12	1 1 0 0	FF	14 12 C	FS	34 28 1C	,	54 44 2C	<	74 60 3C	L	114 76 4C	\	134 92 5C	l	154 108 6C	|	174 124 7C
13	1 1 0 1	CR	15 13 D	GS	35 29 1D	-	55 45 2D	=	75 61 3D	M	115 77 4D	]	135 93 5D	m	155 109 6D	}	175 125 7D
14	1 1 1 0	SO	16 14 E	RS	36 30 1E	.	56 46 2E	>	76 62 3E	N	116 78 4E	^	136 94 5E	n	156 110 6E	~	176 126 7E
15	1 1 1 1	SI	17 15 F	US	37 31 1F	/	57 47 2F	?	77 63 3F	O	117 79 4F	_	137 95 5F	o	157 111 6F	DEL	177 127 7F

C0 CODES — GL CODES (ASCII GRAPHIC)

KEY

CHARACTER: ESC

33 OCTAL
27 DECIMAL
1B HEX

Figure 5

Right Half -- DEC Supplemental Graphic Set

8		9		10		11		12		13		14		15		COLUMN BITS b8 b7 b6 b5 b4 b3 b2 b1	ROW
1 0 0 0		1 0 0 1		1 0 1 0		1 0 1 1		1 1 0 0		1 1 0 1		1 1 1 0		1 1 1 1			
	200 128 80	DCS	220 144 90		240 160 A0	•	260 176 B0	À	300 192 C0		320 208 D0	à	340 224 E0		360 240 F0	0 0 0 0	0
	201 129 81	PU1	221 145 91	¡	241 161 A1	±	261 177 B1	Á	301 193 C1	Ñ	321 209 D1	á	341 225 E1	ñ	361 241 F1	0 0 0 1	1
	202 130 82	PU2	222 146 92	¢	242 162 A2	2	262 178 B2	Â	302 194 C2	ò	322 210 D2	â	342 226 E2	ò	362 242 F2	0 0 1 0	2
	203 131 83	STS	223 147 93	£	243 163 A3	3	263 179 B3	Ã	303 195 C3	ó	323 211 D3	ã	343 227 E3	ó	363 243 F3	0 0 1 1	3
IND	204 132 84	CCH	224 148 94		244 164 A4		264 180 B4	Ä	304 196 C4	ô	324 212 D4	ä	344 228 E4	ô	364 244 F4	0 1 0 0	4
NEL	205 133 85	MW	225 149 95	¥	245 165 A5	µ	265 181 B5	Å	306 197 C5	õ	325 213 D5	å	345 229 E5	õ	365 245 F5	0 1 0 1	5
SSA	206 134 86	SPA	226 150 96		246 166 A6	¶	266 182 B6	Æ	306 198 C6	ö	326 214 D6	æ	346 230 E6	ö	366 246 F6	0 1 1 0	6
ESA	207 135 87	EPA	227 151 97	§	247 167 A7	·	267 183 B7	Ç	307 199 C7	Œ	327 215 D7	ç	347 231 E7	œ	367 247 F7	0 1 1 1	7
HTS	210 136 88		230 152 98	¤	250 168 A8		270 184 B8	È	310 200 C8	ø	330 216 D8	è	350 232 E8	ø	370 248 F8	1 0 0 0	8
HTJ	211 137 89		231 153 99	©	251 169 A9	1	271 185 B9	É	311 201 C9	Ù	331 217 D9	é	351 233 E9	ù	371 249 F9	1 0 0 1	9
VTS	212 138 8A		232 154 9A	ª	252 170 AA	º	272 186 BA	Ê	312 202 CA	Ú	332 218 DA	ê	352 234 EA	ú	372 250 FA	1 0 1 0	10
PLD	213 139 8B	CSI	233 155 9B	«	253 171 AB	»	273 187 BB	Ë	313 203 CB	Û	333 219 DB	ë	353 235 EB	û	373 251 FB	1 0 1 1	11
PLU	214 140 8C	ST	234 156 9C		254 172 AC	¼	274 188 BC	Ì	314 204 CC	Ü	334 220 DC	ì	354 236 EC	ü	374 252 FC	1 1 0 0	12
RI	215 141 8D	OSC	235 157 9D		255 173 AD	½	275 189 BD	Í	315 205 CD	Ý	335 221 DD	í	355 237 ED	ý	375 253 FD	1 1 0 1	13
SS2	216 142 8E	PM	236 158 9E		256 174 AE		276 190 BE	Î	316 206 CE		336 222 DE	î	356 238 EE		376 254 FE	1 1 1 0	14
SS3	217 143 8F	APC	237 159 9F		257 175 AF	¿	277 191 BF	Ï	317 207 CF	ß	337 223 DF	ï	357 239 EF		377 255 FF	1 1 1 1	15

C1 CODES — GR CODES (DEC SUPPLEMENTAL GRAPHIC)

Figure 6

Default Data Communication Settings for Terminal Emulation Sessions

The default data communication settings that the RDC DEC Alpha 7760 expects for all for terminal emulation sessions are as follows:

Duplex	Full
Data bits	8
Stop bit	1
Parity	none

Table 1

Default Keyboard Mapping for Terminal Emulation Sessions

The default keyboard mapping that the RDC DEC Alpha 7760 expects for all VT sessions are:

Keyboard Key	Codes			Comments
	Character	Decimal	Hex	The codes are for Normal key (unless otherwise noted) and Action: Send Text
F1	^[OP	027 079 080	1D 4F 50	
F2	^[OQ	027 079 081	1D 4F 51	
F3	^[OR	027 079 082	1D 4F 52	
F4	^[OS	027 079 083	1D 4F 53	
Tab	^I	009	09	
Shift Tab	^[OP^I	027 079 080 009	1B 4F 50 09	Instead of F1 Tab in SQL*Forms, you can use Shift Tab for Backward Tab
Backspace		127	7F	You can use Backspace to delete backward instead of Delete, however, it may not compatible with some operating systems/modes
Enter	^M	013	0D	
Delete		127	7F	
Home	^[OP^[Ou	027 079 080 027 079 117	1B 4F 50 1B 4F 75	In EDT, you can jump to beginning of document with this key
End	^[OP^[Ot	027 079 080 027 079 116	1B 4F 50 1B 4F 74	In EDT, you can jump to end of document with this key
Page Up	^[Ou^[Ox	027 079 117 027 079 120	1B 4F 75 1B 4F 78	In EDT, you can scroll up one page with this key
Page Down	^[Ot^[Ox	027 079 116 027 079 120	1B 4F 74 1B 4F 78	In EDT, you can scroll down one page with this key
Left Arrow	^[OD			Mapped by host
Up Arrow	^[OA			Mapped by host
Right Arrow	^[OC			Mapped by host
Down Arrow	^[OB			Mapped by host
Keypad 0	^[Op	027 079 112	1B 4F 70	
Keypad 1	^[Oq	027 079 113	1B 4F 71	
Keypad 2	^[Or	027 079 114	1B 4F 72	
Keypad 3	^[Os	027 079 115	1B 4F 73	
Keypad 4	^[Ot	027 079 116	1B 4F 74	
Keypad 5	^[Ou	027 079 117	1B 4F 75	
Keypad 6	^[Ov	027 079 118	1B 4F 76	
Keypad 7	^[Ow	027 079 119	1B 4F 77	
Keypad 8	^[Ox	027 079 120	1B 4F 78	
Keypad 9	^[Oy	027 079 121	1B 4F 79	
Keypad .	^[On	027 079 110	1B 4F 6E	
Keypad /	^[OQ	027 079 081	1B 4F 51	
Keypad *	^[Ol	027 079 108	1B 4F 6C	
Keypad -	^[Om	027 079 109	1B 4F 6D	
Keypad +	^[OQ			Mapped by host
Keypad Enter	^[OM			Mapped by host

Table 2

IBM PC equivalent keystrokes for DEC Video Terminal keystrokes.

Keystroke Equivalency Table

VT Keyboard	IBM PC Keyboard
PF1	F1
PF2	F2
PF3	F3
PF4	F4
F6	F6
F7	F7
F8	F8
F9	F9
F10	F10
F11	CTRL F1
F12	CTRL F2
F13	CTRL F3
F14	CTRL F4
F15	CTRL F5
F16	CTRL F6
F17	CTRL F7
F18	CTRL F8
F19	CTRL F9
F20	CTRL F10
Find	Home
Insert Here	Insert
Remove	Delete
Select	End
Prev Screen	Page Up
Next Screen	Page Down
Left Arrow	Left Arrow
Up Arrow	Up Arrow
Right Arrow	Right Arrow
Down Arrow	Down Arrow

Table 3

While in keypad application mode:

VT Keyboard	IBM PC Keyboard
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
-	+
,	=
.	.
Enter	Enter

Table 4

The DEC Video Terminal can function in either the default seven-bit or eight-bit mode. To translate to eight-bit mode, use the following table:

7-Bit	8-Bit
ESC O (1B 4F)	SS3 (8F)
ESC [(1B 5B)	CSI (9B)

Table 5

Appendix A: Generic Settings For Accessing the RDC DEC Alpha 7760

RDC DEC Alpha 7760 logon/logoff Procedures

Logon And Logoff To The RDC Alpha 7000 And A Character Mode Application

Logging Onto The Alpha And A Character Mode Application

After connecting with the Alpha, there will be a warning screen with "RDC DEC ALPHA" at the bottom. You will then see the following prompt:

Username:

At that point, enter your **Alpha** userid. You will then see the following prompt:

Password:

At that point, enter your **Alpha** password.

If this is your first time logging onto the Alpha, use the Alpha userid as the password. You will then be prompted to reset your password (Your password needs to have a minimum of 6 characters).

Now you will see the login messages ending with the following prompt:

USERX:[XXXX]>

Where "XXXX" is your **Alpha** userid. You are now logged onto the Alpha. To run an application, at the above prompt type:

@[application_name]:[application_name][FY]

at the VMS prompt, where FY represents the fiscal year you want to access. For example, enter @RTPS:RTPS92 to access the fiscal year 92 in RTPS.

NOTE: *Alpha applications have been designed to recognize valid users. Users who have not been assigned a valid application user account in the system by the application administrator will not be able to execute any applications. To obtain an application user account, have the user contact the account manager for the application.*

At this point you are in the application. Follow the instructions in the application's NOAA User's Manual to start entering data in the application. To obtain a copy of this manual contact the application administrator.

Logging Off Of A Character Mode Application And Alpha

Press the **F4** key.

You will be prompted to confirm your action.

Answering "Y" will take you back to the following **Alpha** prompt:

USERX:[XXXX]>

At that point, enter **Logout.**

When the Alpha session has ended and access is via dial-up using ProComm

Enter **{Alt-X}.** The following prompt will appear:

"Exit to DOS?"

"Hang up Line?"

Answer **"Y"** to both questions.

When the Alpha session has ended and access is via IP using ProComm or the FTP Software

Select the File menu

Select Exit

If for any reason you have to terminate your session in a way other than that described above, please immediately notify the OFA Computer Division at (301) 763-6400.

VT Printing Procedures

VT Printing And The RDC DEC Alpha 7760

In order to enable the local terminal print device for use by the VMS print function, the terminal emulation software must be properly configured. The following information is provided as a guide in setting up your particular software. The functionality may be accessed in a different manner depending on the terminal emulation software you are using.

The following settings for the terminal emulation software must be configured correctly before you can print locally:

1. **DO** set the terminal emulation mode to VT-220 or higher.

2. **DO** set the terminal session to support 8 bit DEC control sequences.

3. **DO** set the terminal session to use the DEC multinational character set.

4. **DO NOT** set the terminal session to strip the 8th bit from received characters.

There are two methods to print to a local printer using your terminal emulation software. The first method consists of the RDC DEC Alpha application supporting direct printing to the local terminal print device. The second method consists of using a VMS command to print a file to the local terminal print device from the VMS prompt. Both of these methods are outlined below.

1. If the application you are using on the RDC DEC Alpha 7760 supports printing to your local terminal session, follow these steps to print from your application:

    a. Select the RDC DEC Alpha 7760 application's print command when you wish to print from your application. The print job will then spool to the local terminal session print device.

2. If the application on the RDC DEC Alpha 7760 does not support local printing but does support printing to a file and you have access to the VMS prompt, follow these steps to print to your local terminal print device from the VMS prompt:

    a. Use the print command in the RDC DEC Alpha 7760 application that you are using to print to a file. Make a note of the file name that you create in this step.

    b. To send printed output to the local print device, type "LOC" followed by a single space and the name of the file you created in the previous step.

RDC DEC Alpha 7760 Print Queues

Printing can be directed to the following locations and their queues:

Location	Queue name	Notes
Germantown	Germantown	
SSMC4	wsc5	
	wsc5a	
	wsc5b	
Landover	print	Print outs will be mailed to the user

B. RDC DEC Alpha 7760 Specific Application Access Parameters

The following sections of this chapter have been devoted to the documentation of specific differences—from the default terminal emulation settings—for each of the RDC DEC Alpha 7760 applications available to your users. A brief overview of the applications is listed in Table 6. The table is followed by a paragraph for each application that requires settings that differ from the defaults.

Appendix B: RDC DEC Alpha 7760 Specific Application Access Parameters

Overview

The following table lists the applications and the differences specific to each:

Application	Terminal Emulation Software/Client Application	Access Method	Print Methods Supported	Script required?	Keyboard File required?
CAMS-CFS	Oracle C/S	IP	local via C/S application	n/a	n/a
	VT220	IP & PCN	remote via VMS named-queue	No	Yes
CCS	Oracle C/S	IP	local via C/S application	n/a	n/a
DIST	VT100	IP & PCN	local via Kermit File Transfer	No	No
EMIS	Oracle C/S	IP	local via C/S application	n/a	n/a
	VT220	IP & PCN	local via Kermit File Transfer	No	No
FACTS	VT102	IP & PCN	local via XModem File Transfer	No	No
FADS	Oracle C/S	IP	local via C/S application	n/a	n/a
	VT100	IP & PCN	local via Kermit File Transfer	No	No
FOPS	VT102	IP & PCN	local via XModem File Transfer	No	Yes
FUNDS	VT100	IP & PCN	local via X/ZModem File Transfer	No	No
GRANTS/NGS	VT102	IP & PCN	local via Kermit File Transfer	No	Yes
I/FIMA	WWW Browser	IP	local via WWW Browser	No	n/a
	VT102	IP & PCN	remote via VMS named-queues & local using VT Auto print	No	Yes
NOAA Locator	WWW Browser	IP	local via WWW Browser	No	n/a
	VT100	IP & PCN	remote via VMS named-queue	No	No
NTD	VT100	IP & PCN	local using VT Auto print	Yes	No
OBI	VT100	IP & PCN	local via Kermit/ZModem File Transfer	No	No
OGFIS	VT100	IP	No	No	No
	VT100	PCN	No	No	No
PERSONNEL	VT320	IP	remote via VMS named queue	No	No
Procurement Module (TM)	Oracle C/S	IP	local via C/S application	No	No
RENTS	VT220	IP	None	No	No
RTPS	VT102	IP & PCN	local using VT Auto print	No	Yes
TA (file transfer only)	FTP	IP	n/a	n/a	n/a
	X/Zmodem, Kermit	PCN	n/a	n/a	n/a
Travel History (TH)	VT100	IP & PCN	local via Zmodem File Transfer & remote via VMS named-queue	No	No
Travel Manager (TM)	VT220	IP	local using VT Auto print	No	No

Legend: A "Yes" in the script or keyboard file column means that changes to the defaults are necessary. The acronym PCN refers to Public Circuit Switched Network (aka Dial-up).

Table 7

CAMS-CFS

Application Type:

- Terminal/Host, Client/Server

Printing Capability Differences (Terminal/Host only)

- VT220 sessions: Printing is performed remotely via VMS named-queue.

Terminal Settings Differences (Terminal/Host only) Scripts, Meta Keys, etc.

- Set Terminal Type to VT220

Correspondence Control System (CCS)

CCS Is a Client/Server application that was written using Oracle Developer 2000. The application needs no special settings apart from an application installation from source media.

Distribution (DIST)

Application Type

- Terminal/Host

Printing Capability Differences (Terminal/Host only)

- Printing is facilitated by using Kermit to transfer a remote file to the user's computer. The user then prints the file using a local application.

Terminal Settings Differences (Terminal/Host only)

- Set Terminal Type to VT100

EMIS

Application Type
- Terminal/Host, Client/Server

Printing Capability Differences (Terminal/Host only)
- Prints locally by using Kermit to transfer a remote file to the user's computer where it is printed using a local application.

Terminal Settings Differences (Terminal/Host only)
- Set Terminal Type to VT220

FACTS

Application Type
- Terminal/Host

Printing Capability Differences (Terminal/Host only)
- Prints locally using XModem to transfer a remote file to the user's local computer where it is printed using a local application.

Terminal Settings Differences (Terminal/Host only)
- Set Terminal Type to VT102.

FADS

Application Type
- Terminal/Host, Client/Server

Printing Capability Differences (Terminal/Host only)
- Terminal/Host: Printing preformed locally through Kermit file transfer

Terminal Settings Differences (Terminal/Host only)
- Set Terminal Type to VT100.

FOPS

Application Type
- Terminal/Host

Printing Capability Differences (Terminal/Host only)
- Terminal/Host: Printing preformed locally through XModem file transfer

Terminal Settings Differences (Terminal/Host only)
- Set Terminal Type to VT100.

FUNDS

Application Type
- Terminal/Host

Printing Capability Differences (Terminal/Host only)
- Terminal/Host: Printing preformed locally through X/ZModem file transfer

Terminal Settings Differences (Terminal/Host only)
- Set Terminal Type to VT100.

GRANTS/NGS

Application Type

- Terminal/Host

Printing Capability Differences (Terminal/Host only)

- Printing done locally through standard Kermit file transfer

Terminal Settings Differences (Terminal/Host only)

- Set Terminal Type to VT102.

Interactive FIMA (I/FIMA)

Application Type

- Terminal/Host
- WWW Browser

Printing Capability Differences (Terminal/Host only)

- Remote using VMS named queue, Local VT Auto print

Terminal Settings Differences (Terminal/Host only)

- Set Terminal Type to VT102.

Server address Differences (FQDNs, Phone Nos.)

- WWW: http://ifima.iso.noaa.gov

NOAA Locator

Application Type

- Terminal/Host
- WWW Browser

Printing Capability Differences (Terminal/Host only)

- Remote using VMS named queue

Terminal Settings Differences (Terminal/Host only)

- Set terminal type to VT100

Server address Differences (FQDNs, Phone Nos.)

- WWW: http://www.rdc.noaa.gov/rdc/natloc.html

NTD

Application Type

- Terminal/Host.

Printing Capability Differences (Terminal/Host only)

- Local using VT Auto print.

Terminal Settings Differences (Terminal/Host only)

- Set terminal type to VT100.
- Script required

OBI

Application Type

- Terminal/Host.

Printing Capability Differences (Terminal/Host only)

- Local via Kermit/ZModem File Transfer.

Terminal Settings Differences (Terminal/Host only)

- Set terminal type to VT100

OGFIS

Application Type
- Terminal/Host.

Printing Capability Differences (Terminal/Host only)
- No print capability

Terminal Settings Differences (Terminal/Host only)
- Set terminal type to VT100

Personnel

Application Type
- Terminal/Host.

Printing Capability Differences (Terminal/Host only)
- Remote printing via VMS named-queue

Terminal Settings Differences (Terminal/Host only)
- Set terminal type to VT320

Procurement Module (PM)

Application Type
- Client/Server.

Rents

Application Type
- Terminal/Host.

Printing Capability Differences (Terminal/Host only)
- No print capability

Terminal Settings Differences (Terminal/Host only)
- Set terminal type to VT220

RTPS

Application Type
- Terminal/Host.

Printing Capability Differences (Terminal/Host only)
- Local using VT Auto print

Terminal Settings Differences (Terminal/Host only)
- Set terminal type to VT102

Time & Attendance (T&A)

Application Type
- Terminal/Host.

Printing Capability Differences (Terminal/Host only)

- No print capability

Terminal Settings Differences (Terminal/Host only)

- For IP access, use the FTP command line application (there are no terminal settings required). For dial in access, set the terminal type to any type greater that VT100, and set the file transfer to either XModem, ZModem, or Kermit.

Travel History (TH)

Application Type

- Terminal/Host

Printing Capability Differences (Terminal/Host only)

- Local printing is supported through ZModem file transfer of file to local computer. Remote printing is supported through VMS named-queue.

Terminal Settings Differences (Terminal/Host only)

- Set terminal type to VT100

Travel Manager (TM)

Application Type

- Terminal/Host.

Printing Capability Differences (Terminal/Host only)

- VT print mode must be set to raw to enable printing graphic characters.
- When running Windows 95 - Spool settings should be set to RAW

Terminal Settings Differences (Terminal/Host only)

- Set Terminal Type to VT220.

C. Statement To Developers

Application development efforts, in progress and planned should consider the environment that the application and its users will operate in. In accordance with the ISE and NOE, no further development or procurement of Terminal/Host applications will be accepted for deployment on the RDC DEC Alpha 7760. Modifications to existing legacy applications, in order to meet existing operational requirements, will be authorized after review by the Director for Applications, RDC Landover, MD. Construct your application to offer flexibility and choice, utilizing VMS DCL scripts and services unless doing so would not be feasible in your application. We ask that all Application Developers please contact us early in the development process so that we can facilitate testing and certifying the application for use on the Enterprise Network. Lillian Barnes, Chief, Applications Branch, RDC should be your initial contact concerning new Enterprise Applications. The following are the communication and design specifications that must be met when developing or rewriting applications for use with or on the RDC DEC Alpha 7760:

Storage of Temporary Files.

When your application creates temporary working files, please use the VMS device called **SYS$SCRATCH**. If your program needs to create temporary files using a literal filename, please use the format SYS$SCRATCH: <*FILENAME*>.*TMP*, where <*FILENAME*> is the name you want to give to the file. The file extension .*TMP* is identified in VMS as a temporary file. Using these VMS naming conventions will help us manage leftover temporary files.

Creation of print jobs and print files.

When you need to create print jobs or files in your application, please use the VMS device called **SYS$PRINT**. If your program needs to create temporary files using a literal filename, please use the format SYS$PRINT: <*FILENAME*>.*LIS*, where <*FILENAME*> is the name you want to give to the file. The file extension .*LIS* is identified in VMS as a print file. Using these VMS naming conventions will help us manage the print queue and leftover temporary files.

Log files.

When you need to create log jobs for your application, please use the file format <*FILENAME*>.*LOG*, where <*FILENAME*> is the name you want to give to the log file. The file extension .*LOG* is identified in VMS as a log file. Using this VMS naming convention will help us manage leftover temporary files.

D. Network Access Method By Site

MAN Sites

Site	City	State	Network Access
BEA	SILVER SPRING	MD	DoC FNS
CENSUS	SUITLAND	MD	DoC FNS
CXXI	GERMANTOWN	MD	NOAA FNS
FB3	SUITLAND	MD	NOAA FNS (through FB4)
FB4	SUITLAND	MD	NOAA FNS
HCHB	WASHINGTON	DC	NOAA FNS
HRDS	SPRINGFIELD	MD	DoC FNS
IC	GAITHERSBURG	MD	DoC FNS
NIST	GAITHERSBURG	MD	DoC FNS
OSTM	WASHINGTON	DC	DoC FNS
PTO	WASHINGTON	DC	DoC FNS
RDC	LANDOVER	MD	NOAA FNS
SSMC2	SILVER SPRING	MD	NOAA FNS
SSMC3	SILVER SPRING	MD	NOAA FNS
UNIVERSAL	ROCKVILLE	MD	NOAA FNS
SSMC4	SILVER SPRING	MD	NOAA FNS
WWB	CAMP SPRINGS	MD	DoC FNS

Figure 7

WAN Sites

Site	City	State	Connects via
AMC	NORFOLK	VA	FRN WAN (via EASC)
CASC	KANSAS CITY	MO	FRN WAN, ISP
EASC	NORFOLK	VA	FRN WAN
FED	ASHEVILLE	NC	ISP
MASC	BOULDER	CO	FRN, PSS WAN
RDC	LANDOVER	MD	FRN WAN
SSMC3	SILVER SPRING	MD	FRN WAN
WASC	SEATTLE	WA	FRN WAN

Figure 8

E. Glossary Of Terms

Asynchronous. A method of data transmission that allows characters to be sent at irregular intervals by preceding each character with a start bit, and following it with a stop bit. It is the method most computers (especially PCs) use to communicate with each other and mainframes over a dial-up or direct serial connection.

Backbone. The backbone is the part of the communications network which carries the heaviest traffic. The backbone is also that part of a network which joins LANs together—either inside a building or across a city or the country.

Bell Atlantic FDDI Network Services (FNS). FNS is a high-speed data service, offered by Bell Atlantic, that connects subscriber LANs in metropolitan areas over a shared 100 mbps optical fiber backbone. The FNS MAN is a FDDI network operating at 100Mbps throughout the Metropolitan DC area. The FNS MAN provides access from local client machines to the hosts on remote networks at typical LAN speeds of 10 mbps. See FDDI

Client/Server. The reference to a model of computing in which an application is split into two halves; one half on a server computer and the other half on a client computer. The splitting of tasks allow the use of graphic user interfaces (GUIs), like Microsoft's Windows or Apple's Macintosh operating system, which are easier to use to use (for most people) than the Terminal/Host world of mainframe computing, which placed a "dumb terminal" on a user's desk. Computers are integrated over a network by an application, which provides a single system image. A client can be served by multiple servers.

Control code (C0 code). A character (or assemblage of characters) which represents a specific action to a terminal or terminal emulation software.

Control Sequence Introducer (CSI). A character (or assemblage of characters) which instructs a terminal (or terminal emulation software) that the characters immediately following it is to be interpreted as a command rather than as data.

Daemon. The term used to describe a process (traditionally on a UNIX-based host) that runs on a computer using the TCP/IP network protocol. The daemon runs continuously, waiting for a particular event to occur. An example would be the Telnet daemon, which "listens" for a connection on TCP/IP port 23.

Domain. The part of a computer network in which the data processing resources are under common control; However, on The Internet, most people refer to a domain as a place that can be visited (i.e., a computer, a Web page, etc.)

Escape codes. A set of codes that appear in a text string on a terminal (see terminal emulation). Although these escape codes (which provide formatting information) aren't visible in terminal emulation, they will show up as non-text characters if you capture the text to the screen or printer. In fact, some escape codes may cause the printed

output to skip pages, switch into bold mode, and other undesirable effects because they may coincide with printer command codes.

Ethernet. A local area network used for connecting computers, printers, workstations, terminals, servers, etc. within the same building or campus. Ethernet operates over several different media types and at speeds of up to 10 mbps. For LAN interconnection, Ethernet is a physical link and data link protocol reflecting the two lowest layers of the OSI model.

Fiber Distributed Data Interface (FDDI). FDDI is a 100 mbps fiber optic LAN. Topologically, it is “counter-rotating” token passing logical ring. FDDI rings may use up to 200 km of optical fiber, or may employ twisted copper wire pairs for short hops.

File Transfer Protocol (FTP). A service that supports file transfer between local and remote computers, including The Internet. FTP supports several commands that allow bi-directional transfer of binary and ASCII files between computers. The TCP/IP FTP client is installed with the TCP/IP connectivity utilities. In LAN parlance, FTP is a file sharing protocol that operates at layers 5 through 7 of the OSI model. On The Internet, the FTP protocol is an Internet tool for accessing files archives around the world that are linked to The Internet.

Frame Relay (FR). An access standard defined by the ITU-T in I.122 recommendation, Framework for Providing Additional Packet Mode Bearer Services. FR services employ a form of packet switching analogous to a streamlined version of X.25 networks.

Fully Qualified Domain Name (FQDN). The FQDN is the full site name of an Internet computer system, rather than just its hostname. For example, the RDC DEC Alpha 7760 at the RDC Landover, MD has a FQDN of alpha.rdc.noaa.gov.

Graphic Language code (GL code). A character (or assemblage of characters) which represents a command for a terminal (or terminal emulation software) to display a specific graphic character, either on screen, or in printed output.

HyperText Transfer Protocol (HTTP). Invisible to the user, HTTP is the actual protocol used by the Web Server or and the Client Browser to communicate "over the wire". The protocol for moving documents around The Internet.

Hypertext. Also called hypermedia; software that allows users to explore and create their own paths through written, visual, and audio information. Capabilities include being able to jump from topic to topic at any time and follow cross-references easily. Hypertext is often used for help files as well as Web pages.

Internet Service Provider (ISP). A vendor who provides a direct access to The Internet. Users reach their ISP by either a dial-up connection over a PCN connection with their own computer and a modem, or over a dedicated line.

Internet, The. It is very difficult to define The Internet in a way that is either meaningful or easy to grasp. To say that The Internet is the world's largest computer network is to trivialize it. Once a cooperative research effort of the Federal Government (called ARPA), which tied universities to other universities to their military customers, The Internet has grown has essentially become a new publishing and commerce medium. Its impact on society has been compared to that of the invention of the Gütenberg Printing Press in 1455. At its heart, The Internet is several computer networks joined together over high-speed data links.

Kilobits per second (kbps). One thousand bits per second.

Local Area Network (LAN). A short distance data communications network (typically within a building or campus) used to link computers and peripheral devices (such as printers, CD-ROMs, modems, etc.) under some sort of standard control. Older data communications networks used dumb terminals (devices with no computing power of their own) to talk to distant computers. But the economics of computing changed with the invention of the PC which had "intelligence" and which was cheap. LANs where invented as an afterthought—after PCs—and where originally designed to let cheap PCs share peripherals—like laser printers—which were too expensive to dedicate to individual PCs.

Local Area Transport (LAT). DEC's Proprietary network protocol. The LAT protocol, implemented by the LAT software, that allows the operating system to offer resources, or LAT services that terminal servers can access (as defined by Digital). LAT is a small, non-routable protocol that facilitates network connections between terminal servers and hosts. A terminal server is a network device that connects a dumb (or virtual) terminal session to a host computer over a LAN.

Megabits per second (mbps). One million bits per second.

Metropolitan Area Network (MAN). A loosely defined term generally understood to describe a broadband covering an area larger than a local area network. It typically interconnects two or more local area networks, may operate at a higher speed, may cross administrative boundaries, and may use multiple access methods. It may carry data, voice, video, and image.

Network Interface Card (NIC). Electronic circuitry connecting a workstation to a network. Usually a card that fits into one of the expansion slots inside a PC. It works with the network software and computer operating system to transmit and receive messages on the network.

Permanent Virtual Circuit (PVC). A circuit that provides the equivalent of a dedicated private line service over a packet switching network between two DTEs. The path between the DTEs are fixed.

Plain Old Telephone Service (POTS). See PCN.

Point-of-Presence (PoP). The original definition of this term: The Physical place within a LATA where a long distance carrier or cellular provider interfaces with the network of the local exchange carrier (LEC), also called the local telephone company. This term has expanded to include the point at which either the LEC or any type of data communications service terminate their circuits to either a physical site or the equipment.

Public Circuit Switched Network (PCN). Also known as the Public Switched Telephone Network (PSTN), usually refers to the worldwide voice telephone network accessible to all those with telephones and access privileges (i.e. In the U.S., it was formerly called the Bell System network or the AT&T long distance network).

Public Packet Switched Network (PPSN). A public network designed to carry packets. The primary difference between the PCN and a PPSN is the way in which information is transmitted. In circuit switching, the user makes a connection by dialing the station identifier. The local switch finds an unused path to the remote station. While you are using the connection, it is 100% dedicated to the call. With packet switching, the information flowing over "the wire" is sliced up into small packet of information. Each packet is given a unique identification and each packet carries its own destination address. Each packet may go a different route, and may arrive in a different order depending on how they were shipped. Packet switching is the way The Internet works.

Remote Procedure Call (RPC). A message passing facility that allows a distributed program to call services available on various computers in a network.

Systems Network Architecture (SNA). IBM's successful computer network architecture. At one stage, the most successful computer network architecture in the world. In the days of mainframe computers, it was as successful in the computer networking world as AT&T's telephone network design was in telecommunications. SNA is a tree structured architecture, with a mainframe host computer acting as the network control center. The boundaries described by the host computer, front-end processors, cluster controllers and terminals are referred to as the network's domain. Unlike the switched telephone network that establishes physical paths between terminals for the duration of a session, SNA established a logical path between network nodes, and it routes each message with addressing information contained in the protocol. The network is therefore incompatible with any but approved protocols.

Telnet. One of the application layer services in the TCP/IP network protocol. A terminal-remote host protocol that allows a user to connect to a run programs on a remote computer. Using Telnet, a user can work from their PC as if it were a terminal attached to another machine by a hard-wired line.

Terminal Emulation. In the "old days" of computing, a "terminal" was an input/output device that was a slave of a CPU, such as a terminal for minicomputer or mainframe. Generally, terminals, had no computing power of their own, but simply provided an interface to a remote host computer. "Terminal emulation" refers to a mode (character-based) in which a PC emulates one of these terminals to communicate with a remote

host—typically a BBS computer or a corporate mainframe application that only "knows" how to talk to a terminal.

Terminal/Host. The reference to a model of computing in which a user connects to a remote Host computer (like the RDC DEC Alpha 7760) using a terminal or terminal emulation software (like Telnet) to run an application (like FACTS) on that remote host computer. Terminal/Host computing is characterized by having all of the processing—except for the transmission and interpretation of keystrokes on the terminal side of the connection—being performed on the remote host computer.

User Datagram Protocol (UDP). One of the transport layer services in the TCP/IP (IP portion) network protocol. UDP is a TCP/IP protocol describing how messages reach application programs within a destination computer. UDP is a transport layer, connectionless mode protocol, providing a (potentially unreliable, unsequenced, and/or duplicated) datagram mode of communication delivery of packets to a remote or local user.

Virtual Terminal (VT). Loosely defined, a universal terminal. The ISO virtual terminal (VT) protocol is designed to describe the operation of a so-called universal terminal so any terminal can talk with any host computer. The "VT" is not as important as the numbers that follow it, i.e. VT100, VT320, etc. The numerals following the abbreviation designate which ISO universal terminal is needed to communicate with the host. It is important to note that higher terminal numbers designate newer standards; backward compatibility with previous iterations improves with the higher numbers. In other words, a VT420 will fool a host expecting a VT100 session much better than the opposite scenario.

Wide Area Network (WAN). An data network typically extending a LAN outside a building, over common telecommunications carrier lines to link other LANs in remote buildings in possibly remote cities. A WAN typically uses common carrier lines. A LAN does not. WANs typically run over leased telephone lines and/or services such as PPSN, etc. The jump between a LAN and a WAN is made through a bridge or, more commonly today, a router.

World Wide Web (WWW or Web) Browser. Client software which allows a user to navigate a web of interconnected documents on the World Wide Web (that act of navigating the Web is also known as "surfing" The Internet). It lets a user move easily from one Web Page to another. Every time a user views a Web Page with their Web Browser, it downloads (moves) a copy of the document being viewed onto the user's computer using HTTP. See HYPERTEXT, HYPERTEXT TRANSFER PROTOCOL, WORLD WIDE WEB, WORLD WIDE WEB SERVER, and THE INTERNET.

World Wide Web (WWW or Web) Server. A Web Server is a powerful computer which is connected to The Internet. It stores documents and files—audio, graphics or text—and can display them to people accessing the server via HTTP. A Web Server derives its name because it is part of the World Wide Web. See HYPERTEXT,

HYPERTEXT TRANSFER PROTOCOL, WORLD WIDE WEB, and THE INTERNET.

World Wide Web, The (WWW or Web). An easy but powerful global information paradigm, based on a combination of information retrieval and hypertext navigation techniques. See HYPERTEXT, HYPERTEXT TRANSFER PROTOCOL and THE INTERNET.

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